CLAIMS

1. Process for producing tyres for the wheels of vehicles, the said process comprising the following phases:
   - making a raw tyre comprising at least one crosslinkable elastomeric material;
   - molding the raw tyre in a molding cavity defined in a vulcanization mold;
   - crosslinking the elastomeric material by heating the tyre to a predetermined temperature and for a predetermined time;

   characterized in that the raw tyre comprises at least one crosslinkable elastomeric material comprising an elastomeric polymer containing epoxide groups and an active filler containing hydroxyl groups which is dispersed in the said polymer, and in that the phase of crosslinking of the said elastomeric material is carried out essentially without additional crosslinking agents.

2. Process according to Claim 1, in which the cross-linking phase is carried out by heating the tyre to a maximum temperature of at least 100°C for a time of at least 3 minutes.

3. Process according to Claim 2, in which the cross-linking phase is carried out by heating the tyre to a maximum temperature of at least 120°C for a time of at least 5 minutes.

4. Process according to any one of the preceding claims, in which the active filler is dispersed

in the elastomeric polymer containing epoxide groups, with a dispersion index of greater than 90%.

5. Process according to Claim 4, in which the active filler is dispersed in the elastomeric polymer containing epoxide groups, with a dispersion index of greater than 95%.

6. Process according to Claim 5, in which the active filler is dispersed in the elastomeric polymer containing epoxide groups, with a dispersion index of greater than 98%.

7. Process according to any one of the preceding claims, in which the crosslinkable elastomeric material is characterized by an effective degree of crosslinking equal to at least 65% after no more than 5 min of heating at 170°C.

8. Composition comprising an elastomeric polymer containing epoxide groups and an active filler containing hydroxyl groups dispersed in the said polymer, the said composition being crosslinkable essentially without additional crosslinking agents and being characterized by an effective degree of crosslinking equal to at least 65% after no more than 5 min of heating at 170°C.

9. Composition according to Claim 8, in which the active filler is dispersed in the elastomeric polymer containing epoxide groups, with a dispersion index of greater than 90%.

10 Composition according to Claim 9, in which the active filler is dispersed in the elastomeric

polymer containing epoxide groups, with a dispersion index of greater than 95%.

11. Composition according to Claim 10, in which the active filler is dispersed in the elastomeric polymer containing epoxide groups, with a dispersion index of greater than 98%.

12. Composition according to any one of Claims 8 to 11, in which the elastomeric polymer containing epoxide groups is a homopolymer or copolymer with elastomeric properties, having a glass transition temperature (T_g) of less than 23°C.

13. Composition according to Claim 12, in which the elastomeric polymer containing epoxide groups has a glass transition temperature (T_g) of less than 0°C.

14. Composition according to any one of Claims 8 to 13, in which the elastomeric polymer contains at least 0.05 mol% of epoxide groups relative to the total number of moles of monomers present in the polymer.

15. Composition according to Claim 14, in which the elastomeric polymer contains from 0.1 to 70 mol% of epoxide groups relative to the total number of moles of monomers present in the polymer.

16. Composition according to Claim 15, in which the polymer contains from 0.5 to 60 mol% of epoxide groups relative to the total number of moles of monomers present in the polymer.

17. Composition according to any one of Claims 8 to 16, in which the elastomeric polymer has a mean molecular weight of between 2,000 and 1,000,000.

18. Composition according to Claim 17, in which the elastomeric polymer has a mean molecular weight of between 50,000 and 500,000.

19. Composition according to any one of Claims 8 to 18, in which the elastomeric polymer is an epoxidized diene homopolymer or copolymer derived from one or more conjugated diene monomers, optionally copolymerized with monovinylarenes and/or polar comonomers.

20. Composition according to Claim 19, in which the elastomeric polymer containing epoxide groups is chosen from: natural rubber, polybutadiene, polyisoprene, styrene/butadiene copolymers, butadiene/isoprene copolymers, styrene/isoprene copolymers, nitrile rubbers or mixtures thereof.

21. Composition according to any one of Claims 8 to 18, in which the elastomeric polymer is a copolymer of one or more monoolefins with an olefinic comonomer containing one or more epoxide groups.

22. Composition according to any one of Claims 8 to 21, in which the elastomeric polymer is a mixture with one or more non-epoxidized elastomeric polymers.

23. Composition according to any one of Claims 8 to 22, in which the active filler is chosen from: silica, alumina, titanium oxide, cellulose

fibres, microcrystalline cellulose, zeolites, kaolin, or mixtures thereof.

24. Composition according to Claim 23, in which the active filler is chosen from precipitated silica, pyrogenic silica, alumina, or mixtures thereof.

25. Composition according to any one of Claims 8 to 22, in which the active filler is a filler whose surface is modified with hydroxyl groups.

26. Composition according to Claim 25, in which the active filler is carbon black coated at least partially with silica.

27. Composition according to any one of Claims 8 to 26, in which the surface area of the active filler is greater than 40 m^2/g.

28. Composition according to Claim 27, in which the surface area of the active filler is between 80 and 600 m^2/g.

29. Composition according to any one of Claims 8 to 28, in which the filler has a density of active hydroxyl groups of greater than 1 group/nm^2.

30. Composition according to Claim 29, in which the filler has a density of active hydroxyl groups of greater than 5 groups/nm^2.

31. Composition according to any one of Claims 8 to 30, in which the active filler is present in an amount of greater than 20 phr.

32. Composition according to Claim 31, in which the active filler is present in an amount of between 30 and 150 phr.

33. Composition according to any one of Claims 8 to 32, in which the active filler is a mixture with a non-active reinforcing filler.

34. Composition according to Claim 33, in which the active filler is at least 50% by weight of the total filler present in the composition.

35. Composition according to any one of Claims 8 to 34, also comprising one or more additives chosen from: antioxidants, protective agents, plasticizers, adhesives, anti-ozonizing agents, curing resins, modifying resins, fibres and the like.

36. Composition according to any one of Claims 8 to 35, also comprising a lubricant.

37. Composition according to Claim 36, in which the lubricant is present in an amount of between 2 and 100 phr.

38. Composition according to Claim 37, in which the lubricant is present in an amount of between 5 and 50 phr.

39. Process for preparing an elastomeric composition comprising an elastomeric polymer containing epoxide groups and an active filler containing hydroxyl groups which is dispersed in the said polymer, the said composition being crosslinkable without additional crosslinking agents, the said process comprising mixing the active filler with the polymer for a predetermined time so as to obtain a degree of dispersion of the filler of greater than 90%, and at a predetermined

temperature so as to avoid pre-crosslinking of the composition.

40. Process according to Claim 39, in which the mixing temperature is kept below 130°C.

41. Process according to Claim 40, in which the mixing temperature is kept below 100°C.

42. Process according to Claim 41, in which the mixing temperature is kept below 80°C.

43. Process according to any one of Claims 39 to 42, in which the active filler and the polymer are mixed using an open mixer.

44. Process according to any one of Claims 39 to 42, in which the active filler and the polymer are mixed using an internal mixer.

45. Process according to any one of Claims 39 to 42, in which the active filler and the polymer are mixed using a continuous mixer.

46. Process according to any one of Claims 43 to 45, in which the mixing time is greater than 90 sec.

47. Process according to any one of Claim 46, in which the mixing time is between 3 and 35 min.

48. Process according to any one of Claims 39 to 42, in which the active filler is mixed with the polymer base in the form of an aqueous emulsion or a solution in an organic solvent, and the polymer containing the dispersed filler is then separated out by precipitation.

49. Crosslinked manufactured product comprising an elastomeric polymer containing epoxide groups and an active filler containing hydroxyl groups which

is dispersed in the said polymer, characterized in that the said manufactured product is crosslinked essentially without additional crosslinking agents, and the filler is dispersed in the polymer, with a dispersion index of greater than 90%.

50. Manufactured product according to Claim 49, in which the active filler is dispersed in the elastomeric polymer containing epoxide groups, with a dispersion index of greater than 95%.

51. Manufactured product according to Claim 50, in which the active filler is dispersed in the elastomeric polymer containing epoxide groups, with a dispersion index of greater than 98%.

52. Manufactured product according to any one of Claims 49 to 51, which is obtained by crosslinking, essentially without additional crosslinking agents, a composition according to any one of Claims 8 to 38.

53. Tyre for the wheels of vehicles, comprising one or more components made of crosslinked elastomeric material, characterized in that at least one of the said components comprises a crosslinked elastomeric material comprising an elastomeric polymer containing epoxide groups and an active filler containing hydroxyl groups dispersed in the said polymer, the said material being crosslinked essentially without additional crosslinking agents.

54. Tyre according to Claim 53, in which the crosslinked elastomeric material is obtained by crosslinking, essentially without additional crosslinking agents, a composition according to any one of Claims 8 to 38.